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GAS ABSTRACTS

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A special microfilm edition of Gas Abstracts can be supplied by University Microfilms, 313 N. First St., Ann Arbor, Michigan.

1. GAS INDUSTRY

Gas Conservation

Enright, R. J. GAS BATTLE SHAPES UP. *Oil Gas J.*, 53, 120-21 (1955) March 21.

A discussion of the issues involved in the "economic waste" bill now being studied by the Texas Legislature. A group of independent producers and royalty owners in Texas are supporting the bill while the large producers and pipelines are opposed. The "economic waste" bill is in effect a minimum price bill.

R. F. Bukacek

Industry Regulation

Lohman, P. H. COMPETITION: OUR BEST BET FOR GAS PRODUCTION. *Public Util. Fortn.*, 55, 358-65 (1955) March 31.

A discussion of factors in the regulation of natural gas production. R. F. Bukacek

New England Gas Cost

Henry, Hall M. IS NEW ENGLAND HEADED BACK TOWARD MANUFACTURED GAS? *Gas* 31, 50-56 (1955) March.

Increase in the cost of natural gas is attributable to the rise in the field price and this is causing the New England distribution companies to consider the economic aspect of producing all or at least part of their send-out gas. This is based on the fact that increases in the field prices result in a secondary increase of the commodity charge which means, in many cases, that substantial volumes of interruptible loads may no longer be obtainable. In turn, the loss of this load may mean inability to develop the load factor used in determining the rate formula being used. In line with this, the article looks into the present costs of producing gas to determine whether the economic position of New England companies may or can be unduly affected by natural gas prices.

Publisher's Abstract

Peak Shaving Economics

Harrison, A. D. THE ECONOMICS OF PEAK SHAVING AND STORAGE GAS. *Gas Age*, 115, 25-30, 73, 74 (1955) March 10.

The economics of meeting an estimated zero-day load of 200 MMCF in the winter of 1955/56 with pipeline gas, storage gas and peak load gases, consisting of high-Btu oil gas produced from light and heavy oil, refinery oil gas-air and LP-gas-air, are discussed. The basis for Brooklyn Union Gas Co. calculations is the requirement of profitable gas sales down to 25% load factor. Since the purchase of pipeline gas in New York at such a load factor is not possible and since the cost of gas stored in fields from 200-300 miles away is not too attractive, peakshaving is definitely in the picture. For example, during the recent all-time peak of February 3, 1955, the total send-out of 170 MMCF consisted of 82 MMFC flowing natural gas, 23 MMCF stored natural gas, 55 MMCF oil gas, 5 MMCF refinery oil gas-air, and 5 MMCF LP-gas-air. It is estimated that additional firm or stored natural gas purchased to supply additional load would cost 60 cents/MCF based on present prices which is approximately the same as the cost for peak-shaving gas. H. R. Linden

Public Power Revision

Beebee, A. M. ARE PUBLIC POWER PROGRAMS IN THE PUBLIC INTEREST? *Public Utilities Fortn*, 55, 409-12 (1955) April 14.

The author believes that the principles underlying this country's public power program have outlived their usefulness and no longer serve the public interest. He proposes a corrective program. R. F. Bukacek

State Regulation

LET STATES REGULATE PRODUCTION. *Gas Age*, 115, 21-24 (1955) March 24.

A report of the special Presidential Advisory Committee on Energy Supplies and Resources Policy which favors state regulation over federal regulation of gas production and recommends eminent domain for gas storage projects.

R. F. Bukacek

Reserves

Committee on Natural Gas Reserves. GAS RESERVES AT HIGH LEVEL. *Am. Gas Assoc. Monthly*, 37, 3-5 (1955) April.

Detailed information is presented on estimated proved recoverable reserves of natural gas and natural gas liquids in the United States. Total proved gas reserves continue to increase though 1954 production reached the record level of 9.4 trillion cubic feet. Total natural gas and liquid hydrocarbon reserves now stand at 211.7 trillion cubic feet and 34.8 billion barrels.

R. T. Ellington

2. APPLIANCES

Air Conditioning

Ashley, C. M. AIR CONDITIONING NOISE CONTROL — GOOD? BAD? — OR DIFFERENT? *Refrigerating Eng.*, 63, 31-35 (1955) March.

This paper was presented before the Fifth Annual Noise Abatement Symposium. The character and acceptability level of noise and the relation between noise and the air conditioning system, are discussed. J. F. Reed

Clark, W. W. COMPETITIVE DOMESTIC AIR CONDITIONER USES GAS-DRIVEN COMPRESSOR. *Gas*, 31, 82-3 (1955) April.

A turbine-drive and a compressor-drive for compression refrigeration which offer some possibility of being re-engineered for domestic use are discussed. The turbine unit was developed for military use and is presently of too large size and too costly for immediate consideration. R. T. Ellington

Farris, R. W., Joung, W. S., Jr. AIR CONDITIONING NOISE CONTROL—ALL QUIET ON THE RESIDENTIAL FRONT? *Refrigerating Eng.*, 63, 36-39, 112 (1955) March.

Adapted from a paper presented at the A.S.R.E. meeting in Philadelphia, this report emphasizes the control of noise at its source in an air conditioning system. This may be realized by vibration isolation at the unit, absorptive lining at the plenum, use of flexible connections, lining of the ducts, sound traps and grille absorbers. J. F. Reed

Appliance Sales

Martin, E. R. GAMMA SEES '55 SALES RISE. *Amer. Gas Assoc. Monthly*, 37, 3, 4, 31 (1955) March.

Each year member copanies of Gas Appliance Manufacturers Association are queried regarding their manufacturing plans, based on their own market research. This data is analyzed and the consensus provides a valuable guide to the industry as a whole. The prospect for 1955 in GAMA's view, follows, the year ahead will present design and performance improvements in kitchen appliances. The sales of gas incinerators will increase by 17.1% and gas unit heaters will increase 15.7%. In general, 1955 activity will increase by 5% greater than that of 1954. J. G. Chalcraft

Design for Altitude

Vinson, N. L. DESIGN CORRECTIONS FOR ALTITUDE. *Air Cond., Heating and Ventil.*, 52, 91-96 (1955) February.

Designs are prepared for various altitudes, while most rating tables and design procedures are based on sea level conditions. This article covers the correction requirements for various applications within the fields of heating, ventilating, air conditioning and refrigeration. J. G. Chalcraft

Dryer Design

Graser, C. F. HOW WE STYLED THE NEW WASHER-DRYER. *General Electric Rev.*, 58, 8, 9, 12 (1955) March.

Procedures followed in developing the appearance design of the General Electric washer-dryer combination are discussed. Development was begun over two years ago, and has been a coordinated effort of several divisions of the company. E. F. Searight

Gas Heating Increase

AGA BUREAU OF STATISTICS GAS HEATING TO INCREASE. *Amer. Gas Assoc. Monthly*, 37, 24, 43 (1955) March.

During each of the next two forthcoming summers an additional 1,250,000 throughout the nation will install equipment to permit them to heat with gas bringing the total number of gas-heated homes to 16,500,000 by the beginning of the 1956-57 winter season. Nearly 1,100,000 new heating customers were added to gas utility lines for service during the 1954-55 heating season. For the entire country, the heating saturation has now reached 50.6% and is expected to approximate 60% within another two years. J. G. Chalcraft

Gas vs Electric Cooking

Spink, C. KILOWATT KOOKERY KAN'T KOMPARE. *LP-Gas*, 15, 37-39 (1955) March.

Two of Florida's finest restaurants found that electricity did not satisfy their cooking needs. Not only were the electric-cooked dinners too slow to prepare, but operating expenses were high and food lacked desireable quality. Replacement with LP-gas-fired equipment quickly corrected this problem. E. F. Searight

Kitchen Design

HANKBOOK OF KITCHEN DESIGN. Small Homes Council, Univ. Illinois, Urbana (1950) 73 pages.

The handbook is for architects, contractors, builders, home economists and others who design kitchens utilizing factory-built cabinets. The handbook is designed to assist the user in obtaining the maximum use of kitchen space and achieve the greatest work ability within that space while minimizing the waste of expensive floor space, in small basementless homes. R. T. Ellington

"Valance" Heating

Bailey, G. B. and Lorenzi, R. J. THE VALANCE HEATING AND COOLING SYSTEM. *Air Cond., Heating and Ventil.*, 52, 81-87 (1955) March.

Results obtained during a full year's operation of a unique heating and cooling system installed in the office annex of the John B. Pierce Foundation in New Haven, Connecticut, indicate that it has some interesting possibilities. The system can be best described as "valance" heating and cooling which differentiates it from the conventional baseboard heating system, of which it is in many ways the exact opposite.
Authors' Abstract

Water Heaters

Davis, R. L. HOW RHEEM LINES WATER HEATERS WITH GLASS. *Ind. Gas*, 33, 6, 7, 24 (1955) March.

This year, for first time in history, nonferrous water heaters will exceed 50 per cent of total industry production. Here is method employed by Rheem Mfg. Co. at new Sparrows Point plant. Author's Abstract

Murray, R. HOW TO SIZE AND INSTALL GAS WATER HEATERS CORRECTLY. *Air Cond., Heating and Ventil.*, 52, 86-90 (1955) February.

Data are presented on the proper sizing of a gas-fired water heater to meet hot water demands. Also covered are pointers regarding the installation of such heaters, placement of relief valves, and measures to be followed for proper venting. Author's Abstract

3. COMBUSTION AND INDUSTRIAL FURNACES

Flame Research

Levy, A. and Kurz, P. F. AN ANALYSIS OF THE STABILITY OF CARBON MONOXIDE-HYDROCARBON AIR FLAMES. *J. Am. Chem. Soc.*, 77, 1459-61 (1955) March 20.

Combustion studies with mixed fuels have shown that the stability limit of a mixture of two fuels normally falls between the limits of the individual fuels. An interesting anomaly occurs with carbon monoxide-hydrocarbon flames burning in air, in that this binary fuel mixture has greater stability than either the carbon monoxide or the hydrocarbon burning alone in air. Other research has shown that the slow, preflame oxidation of methane inhibits the oxidation of carbon monoxide. Consequently, carbon monoxide-hydrocarbon mixtures, before entering the flame zone, may be transformed to carbon monoxide-water vapor mixtures by preflame preferential oxidation of the hydrocarbon. The stabilities of the carbon monoxide-hydrocarbon flames reported by Walker and Wright agree with experimentally measured stabilities of carbon monoxide-water vapor mixtures of equivalent composition. Thus the apparent anomaly may be resolved, and the postulate of preflame preferential oxidation of the hydrocarbon in the mixture is supported.
Authors' Abstract

DeZubay, E. A. A STUDY OF FLAME STABILITY BASED ON REACTION RATE THEORY. Am. Soc. Mech. Eng. Paper No. 54-SA 27 (1954) June.

The experimental results of burning in the wake of circular disks are presented. Two test ducts of different diameters were used with a variety of disk sizes. Velocities from 40 to 875 fps were investigated over a pressure range of 2.5 psia to 15 psia. Two fuels were used in supplying a homogeneous fuel-air mixture to the test duct, namely, propane and hydrogen. The temperature and humidity of the mixture were maintained at constant values. The limiting fuel-air ratios of both hydrogen-air and propane-air mixtures can be correlated with velocity, pressure and disk size. Author's Abstract

Vichnievsky, R., Sale, B. and Marcadet, J. COMBUSTION TEMPERATURES AND GAS COMPOSITION. *Jet Propulsion*, 25, 105-118 (1955) March.

A method is presented for approximate flame temperature calculations. The method is based on the assumption that the dissociation of CO_2 and H_2O are determined by the flame temperature and the concentration of CO_2 and H_2O respectively. Tables are given for the "effective enthalpies" of CO_2 and H_2O as functions of these variables, at atmospheric pressure. Curves are given that permit temperature calculations for systems at other pressures. The resultant temperature values are within 1% of those obtained by more rigorous methods. A graphical method is also given for the calculation of the composition of combustion products when the reactant composition and the flame temperature are known. S. A. Weil

Free-Piston Turbines

Ehrat, A. M. FREE-PISTON GAS-TURBINE PRIME MOVERS. *Mech. Eng.*, 77, 212-16 (1955) March.

A review of the basic principles involved in free-piston gas-turbine units. R. F. Bukacek

Fuel Changeover

Burt, E. A. ADVANTAGES OF AUTOMATIC CHANGEOVER. *Gas Age*, 115, 34, 35, 60, 62 (1955) March 24.

In some areas it is possible to obtain very favorable gas rates on the basis of interruptible service, or curtailment of service during particular hours of the day. In order to take advantage of such rates, and to still maintain continuity of operation it is necessary to provide for instantaneous changeover to an auxiliary fuel. The changeover must involve shutting down of the burner, closing the primary fuel gas valve, purging the boiler, locking out the primary fuel controls, opening the alternate fuel valve, energizing the alternate fuel circuits, and reestablishment of pre-purge ignition and main flame. E. F. Searight

Furnace Atmospheres

Beggs, D. DRY NITROGEN-BASE PREPARED ATMOSPHERES. *Ind. Heating*, 22, 526-528, 530, 532, 534, 536, 538 (1955) March.

Methods and equipment for preparation and characteristics and applications of the dry gases produced, are described in this article, which comprises a paper presented at the industrial furnace atmosphere session of the Industrial Heating Equipment Association. J. G. Chalcraft

Ogle, M. R. DISSOCIATED AMMONIA (FURNACE ATMOSPHERE). *Ind. Heating*, 22, 264-6, 268-70, 272, 430 (1955) February.

Equipment for anhydrous ammonia dissociation, applications of the end product and cost of preparing dissociation ammonia are discussed in this article, which comprises a paper presented at the industrial atmospheres session of the Industrial Heating Equipment Association. J. G. Chalcraft

Gas-Oil Fired Boilers

Burt, E. A. ADVANTAGES OF AUTOMATIC CHANGEOVER. *Gas Age*, 115, 34, 35, 60, 62 (1955) March 24.

In automatically-fired boilers, instantaneous changeover of fuel from oil to gas or vice versa is a procedure that is receiving increased attention from users of packaged automatic boilers as an additional means of controlling the economy and continuity of operations. Author's Abstract

Heat-Processing Charts

Sonn, H. W. METHODS ANALYSIS: KEY TO GREATER EFFICIENCY. *Ind. Gas*, 33, 3-5, 20, 23 (1955) March.

How to prepare and use flow process charts for heat-processing operations. A sample chart is shown. J. G. Chalcraft

Induction Heating

Hartwig, C. H. SIXTY-CYCLE INDUCTION HEATING OF LARGE STEEL SECTIONS FOR HOT FORMING: III. *Ind. Heating*, 22, 46, 48, 190-194 (1955) January.

Temperature, current and power test data for induction heating of 8 x 8" carbon, silicon, tool and non-magnetic ingots to forging temperatures and the type of coil used for these tests were discussed in Parts I and II. Temperature, current and power curves resulting from 60 cycle induction heating of larger ingots of these same type steels are presented in this installment. J. G. Chalcraft

Industrial Heating

Abram, J. C. METAL MELTING OPERATIONS OFFER THE LPG DEALER LARGE SALES POTENTIAL. *Butane-Propane News*, 17, 67-70 (1955) March.

The article describes two processes involving metal melting, using LP-gas, one process requiring high production and the other extreme accuracy. J. G. Chalcraft

Helme, W. CRANE CO. CELEBRATES CENTENNIAL. *Ind. Gas*, 33, 12-14, 23, 24 (1955) March.

Gas is used for a great many heating applications at Crane Co. This company, begun in 1855, has been using gas since about 1881. The yearly volume is over one billion cubic feet.

E. F. Searight

Rochow, W. F. and Burke, W. C. REFRACTORY DESIGN INCREASES ROTARY KILN EFFICIENCY. *Mining Eng.*, 7, 285-90 (1955) March.

Various types of refractories and the uses made of them in rotary kiln practice are described. Refractory combinations and the use of quadrant dividers, dams and lifters are discussed.

R. T. Ellington

Mann, C. P. HEAT PROCESSING COMBUSTIBLE MATERIAL. *Mech. Eng.*, 77, 219-22 (1955) March; Eng. Digest (Brit.) 16, 191-3 216 (1955) May.

The use of high-temperature gas-generated radiation and direct flame impingement for processing plastic film, imitation leather, drying adhesive on paper and treating laminates is discussed qualitatively. R. T. Ellington

Pressure Regulation

Downe, E. R. (assigned to The C. A. Olsen Manufacturing Co.) PRESSURE REGULATOR MEANS FOR GAS PILOT BURNER. U. S. 2,704,572 (1955) March 22.

The object of the invention is to provide regulation of gas supply to the pilot burner, independent of main burner gas supply during main burner outage, but affected by manifold gas pressure to increase gas supply to the pilot burner. J. G. Chalcraft

Weed Flaming

Abell, C. AGRICULTURAL FLAMING IS A FAST-GROWING NEW MARKET FOR LPG. *Butane-Propane News*, 17, 47-48 (1955) March.

The article concerns agricultural flaming equipment with its myriad of uses; especially the control of weeds and insects in crop rows and along ditch banks. The author is trying to emphasize the substantial balanced market for LP-gas, because of its agricultural uses in the summer when the winter heating load is off.

J. G. Chalcraft

4. CARBONIZATION AND GASIFICATION

Carbon Gasification

Walker, P. L., Jr., and Rusinko, F., Jr. GASIFICATION OF CARBON RODS WITH CARBON DIOXIDE. *J. Phys. Chem.*, 59, 241-4 (1955) March.

The gasification of six commercial carbons with carbon dioxide was investigated at temperatures of 900° to 1300° C. in order to determine the effect of the carbon properties on the gasification rates. Properties considered were: quantitative and qualitative ash analyses, hydrogen content, interlayer spacing, average crystallite size, density, porosity, surface area and effective diffusion coefficients of hydrogen through the carbons. Differences in the gasification rates of the carbons could not be accounted for by the carbon properties. E. J. Pyrcioch

Walker, P. L., Jr., Rusinko, F., Jr. and Raats E. CHANGES OF MACROPORE DISTRIBUTIONS IN CARBON RODS UPON GASIFICATION WITH CARBON DIOXIDE. *J. Phys. Chem.*, 59, 245-9 (1955) March.

The distribution of macropores in six carbon rods before and after gasification was determined for the pore-radius range of 350 to 130,000 A. It is shown that the greater part of the macropore volume falls within a narrow pore-radius range which is roughly 8,000 to 20,000 A for rods with petroleum coke as filled and in the region of 1,300 A for the lampblack rod. Gasification produced a relatively small change of the surface-area contribution in the macropore range. No correlation between the macropore structure of the carbons and their gasification rates was found. (See preceding abstract).

E. J. Pyrcioch

Coal Processing

Pettyjohn, E. S. (assigned to The Institute of Gas Technology, Chicago) METHOD OF DEVOLATIZING COAL FUEL. U. S. 2,706,706 (1955) April 19.

Smokey coal containing 25 to 38 percent volatile matter is continuously reduced in volatile content by continuously feeding minus 6-mesh granules to a hot vortex chamber with a hot air blast, wherein it is suspended by additional air at 800 to 1200° F., comminuted by impact and attrition in the presence of the burning volatile matter, and the finely divided, partially devolatilized coal is continuously withdrawn from the vortex and utilized while hot as a suspended furnace feed, a briquetting material for smokeless domestic fuel, or is cooled as a char for blending in coke manufacture.

O. P. Brysch

Coal Research, 1954

Igoe, J. W. and Rose, H. J. WORLD COAL RESEARCH IN 1954. *Mining Congress J.*, 42, 92-8, 114 (1955) February; Paper, Amer. Chem. Soc., Gas and Fuel Div., April 6, 1955.

A survey of all coal research activities known to Bituminous Coal Research, Inc. during 1954 is reported. Research on properties, which included geological factors and also chemical and physical properties, was carried on at the State mining or geological surveys of Alabama, Illinois, Ohio, Pennsylvania State, Virginia, and the United States. Studies are reported on production and preparation which included mine lighting, roof rock, washing, screening, drying, crushing, reserves, pipe-line transport, waste disposal and underground gasification from these groups and also from producing and equipment companies, and from Mellon Institute, Washington Univ. and West Virginia Univ. Utilization as fuel was especially under study by Babcock and Wilcox Co., Bituminous Coal Research, Inc., Fairmont Coal Bureau, Midwest Research Inst. and Norfolk and Western Railway Co., as well as by U.S. Bureau of Mines, and State schools. Research on conversion to coke and gas was reported from many of abovementioned groups and also from American Gas Assoc., Eastern Gas and Fuel Assoc., Inst. of Gas Technology, Koppers Co., Inc., A. D. Little, Inc., Pittsburgh Consolidation Coal Co., Sinclair Coal Co., as well as from special projects at Universities of Pennsylvania, Northwestern, Utah, Iowa State, and Wyoming. Foreign coal research on mining and preparation problems, gasification, power fuel and coking are reported from the government, trade association and university laboratories of Australia, Canada, England, France, Germany and South Africa.

O. P. Brysch

Coal Sulfur

Chapman, W. R. and Rhys Jones, D. C. THE REMOVAL OF SULFUR FROM COAL. *J. Inst. Fuel*, 28, 102-8, 116a (1955) March.

The high sulfur coals of Britain are of high pyritic sulfur content, with uneven distribution of pyrite both in quantity and in state of subdivision throughout the coal seam. The degree of fineness of the pyrite (and marcasite) particles is of commercial importance, since the extremely fine sizes usually cannot be removed by conventional washing methods. Effects of grinding, ultimate use of cleaned product, combinations of processes and recovery of pyrite are discussed for American and British coals, with eleven tables of data.

O. P. Brysch

Hydrocarbon Cracking

Francis, C. B. CONVERSION OF LIQUID HYDROCARBONS TO FIXED GASES. U. S. 2,705,193 (1955) March 29.

The method of producing fuel gases from liquid carbonaceous hydrocarbon mixtures is claimed, which comprises the steps of subjecting the liquid to a cracking process by injecting it at a controlled rate and at a fixed point centrally located in a particulate body of hard hematite maintainied at a temperature above 1450 deg. F. and subsequently subjecting the products of the said cracking process to the action of steam and gas simultaneously injected into the body of hematite at points down stream from the point of injection of the carbonaceous liquid, thereby producing a combustible mixture of fixed gases having a higher heating value than that of hydrogen, carbon monoxide and mixtures thereof.

Author's Abstract

Schenk, P. and Osterloh, K. VERSUCHE ZUR KATALYTISCH-THERMISCHEN SPALTUNG VON GASFOERMINGEN UND FLUESSIGEN KOHLENWASSERSTOFFEN.

(RESEARCH ON THE CATALYTIC-THERMAL CRACKING OF GASEOUS AND LIQUID HYDROCARBONS. *Gas- und Wasserfach* (German), 96, 1-8 (1955) January 1.

Theoretical and experimental results are given for catalytic cracking of propane with steam, thermal cracking of propane with steam, thermal-catalytic reforming of methane with air and steam, and thermal-catalytic cracking of propane and propane-butane mixtures in air and steam. Nickel catalysts of varying nickel content were employed in the pilot plant which comprised six alloy steel tubes of 12.5 cm diam and 6 meter length in a gas fired furnace. The thermal catalytic reactions were conducted at 750-1000° C. and atmospheric pressure, with steam and air preheated to 300° C. and hydrocarbons preheated to 100° C. Photographs and tabular data are included.

C. G. von Fredersdorff

5. NATURAL GAS AND NATURAL GAS CONDENSATES

Acidizing Theory

Clason, V. E. ACID KINETICS IN LIMESTONE FORMATIONS. *Petroleum Eng.*, 27, B111-12 (1955) March.

The rate of reaction of acid with limestone has been investigated in the laboratory. Application of this information to a theoretical study of the acidizing of a well is reported.

B. E. Eakin

Adsorption Separation

GAS SEPARATION TURNS TO FLUIDIZATION. *Chem. Eng.*, 62, 120-22 (1955) March. A gas separation method developed by Standard Oil Development Co. uses adsorption on activated fluidized char in a bubble cup tower. This novel idea has been proved on separations involving light hydrocarbons. Polymerizable material boiling above pentane tend to deactivate the char.

W. G. Bair

Drilling

Bobo, R. A., Hoch, R. S., Ormsby, G. S. KEYS TO SUCCESSFUL COMPETITIVE DRILLING. *World Oil*, 140, 113-16 (1955) March.

The effect of bit loading and rpm on instantaneous penetration rate are discussed. Rotary speeds for hard and soft formations, the importance of drill collar weight, and the effect of bit weight stabilization on bit performance are covered.

B. E. Eakin

Bromell, R. J. STRAIGHT HOLE DRILLING. *Petroleum Eng.*, 27, B95-96, 98-100 (1955) March.

Various techniques of drilling crooked holes followed by straightening the hole are shown to be questionable in effectiveness and expensive. The use of charts of Lubinski and Woods can in most cases result in lower costs. A planned scientific approach is the best method of handling crooked holes. Proper selection of drill-collar size and reamer and stabilizer placement greatly reduces the cost per foot.

B. E. Eakin

Day, S. G. DRILLING OPERATIONS IN THE APPALACHIAN BASIN. *Petroleum Eng.*, 27, B66, 69 (1955) March.

Pennsylvania's production in the Leidy field is from the deep Oriskany Sand, Lower Devonian Age. When cable tools were used gas sands encountered above the Oriskany resulted in "blow ups" and sometimes fires. Also the cable tool rigs could not properly handle the 6300 to 7300 feet of 7" casing usually set in these wells. The rotary rig utilizing air drilling techniques has proven to be the answer to these problems, even though the cost per day for a rotary rig far exceeded that for cable tools.

B. E. Eakin

Exploration

Price, W. A. A NEW APPROACH TO MAPPING THE CONTINENTAL SHELF. *Oil Gas J.*, 47, 106-11 (1955) March 28.

A regional basis has been developed that permits mapping of the Continental Shelf. The approach and methods are in part those of shallow-water oceanography as developed on the Gulf Coast in recent years. The oceanographic methods are blended with those found useful in regional reconnaissance of the Pleistocene plains on land. Maps representing the northern Gulf are shown.

B. E. Eakin

Rogers, D., Jr. SUB-DEVONIAN EXPLORATION IN THE NORTHERN APPALACHIAN BASIN. *Petroleum Eng.*, 27, B35-42 (1955) March.

Information on the potentialities and character-

istics of Silurian, Ordovician, and Cambrian formations has been obtained from deep tests drilled in this area. The purpose of this article is to summarize and review some of the more important sub-Devonian tests drilled in the basin during the last seven years. The results of this exploration and trends in the geologic thinking and possibilities are also given. In all, data from 22 wells is examined. B. E. Eakin

Flooding by LP-Gas

Enright, R. J. L.P.G. FLOODING TESTED IN TEXAS. *Oil Gas J.*, 47, 92-93 (1955) Mar. 28.

In 1952 the initiation of an LP-Gas underground storage project in a partially depleted limestone reservoir that was still being produced resulted in a marked increase in oil production. The same company is planning two new projects and many of the larger companies are investigating the "miscible fluid" type of secondary recovery, of which this is an example, in their laboratories. B. E. Eakin

Fracturing Practice

Thorvaldson, W. M. FRACTURING IN CANADA. *Petroleum Eng.*, 27, B69-72 (1955) February.

Until the middle of 1953 fracturing as a method of production stimulation was used in Canada. A total of only 30 to 40 wells had been fractured prior to a very successful job in June of 1953. Since then fracturing has been used in all areas of Canada at a rapidly increasing rate. Several case histories are included. B. E. Eakin

Logging

Canfield, C. R. HERE'S A TOOL THAT LETS YOU SEE WHAT GOES ON BELOW. *Oil Gas J.*, 47, 111-17 (1955) March 28.

The new tool described in this article will provide a record of what actually takes place when a bit is drilling. The instrument will have two very important uses: it will help to evaluate drilling techniques; and it will also serve as a logging tool to give information about the formations penetrated. B. E. Eakin

Kerr, A. J. HOW R/A WELL LOGGING IS USED IN WEST TEXAS. *World Oil*, 140, 134, 137 (1955) March.

This article shows the value of radioactivity well logging in the completion of many wells where depth checks, porosity determination, and absolute definition of formations as tops and bottoms are found to be critical. The neutron curve can be calibrated so that formation porosity can be read directly from the chart. Comparisons of field results with laboratory measurements on cores from the same wells have shown agreement in porosity to within 1%. B. E. Eakin

Meters

Heim, D. J. PLANNED METER RETIREMENT. *Gas Age*, 115, 26-7, 63-4 (1955) Mar. 24.

The utility of scientific meter cost studies in arriving at meter retirement policies is discussed. The mileage theory of retirement is briefly considered, and the importance of keeping cost studies up to date is emphasized. This was the Honor paper in the Rockwell essay contest. G. G. Wilson

McLeod, D. L. THE ECONOMICS OF PLANNED METER RETIREMENT. *Gas Age*, 31-3, 74 (1955) March 10.

Winner of second prize in the Rockwell Contest. Figures on overhaul costs by types of overhaul, overhaul cost comparisons, and annual meter costs are tabulated. Figures indicate economic life of meter is about 20 years. G. G. Wilson

GAS SELECTED BIBLIOGRAPHIES — 6. GAS METERS AND MEASUREMENT. *Gas*, 31, 149 & 150 (1955) March.

The sixth installment of a series of bibliographies listing outstanding articles on gas measurement that have appeared in *GAS*. Publisher's Abstract

Perforating Methods

Gatlin, C. PERFORATING OF ALL TYPES. *Petroleum Eng.*, 27, B91-94 (1955) February.

A review of the various methods of perforating, with tables of penetration for various types of bullets, and a comparison of the use of jet and bullet type guns. This is a very concise discussion of the fundamentals of this type of production stimulation. B. E. Eakin

Piping Standards

Amer. Petroleum Inst. TENTATIVE STANDARD FOR FIELD WELDING OF PIPE

LINES. API. Std. 1104, 3rd Ed. (1955) March.

This specification for the welding of cross-country pipe lines for petroleum crude and products, and natural gas was prepared by a committee representing the Amer. Petroleum Institute, Amer. Gas Association, Pipe Line Contractors Association, Amer. Welding Society, Society for Non-destructive Testing, and the pipe manufacturers and associated industries. The welding specification includes in detail the definitions, equipment, materials, procedure, welders qualification, and inspection. Standards of acceptability describe the limits of size of defects located by radiography, defect measurement, and repair of defects. Radiographic procedure is specified to control production of radiographs, techniques, film, chemicals, protection and operators. Forms for procedure qualification and records are appended for users adoption (see also Gas Abs. 11, 48 (1955). O. P. Brysch

API TUBULAR GOODS STANDARDS REVIEWED. *World Oil*, 140, 152, 154, 156, 158 (1955) March.

In 1954 the specifications on oil field tubular goods were reviewed and many modifications adopted. This report presents the work of the API Committee on Standardization of Oil Country Tubular Goods as given at the 34th annual meeting in Chicago. B. E. Eakin

Hough, F. A. THE NEW GAS TRANSMISSION AND DISTRIBUTION PIPING CODE. CHAPTER II. WELDING ON COMPLETED PIPE. *Gas*, 31, 145-6 (1955) March.

A discussion of the background material involved in the development of chapter II of ASA B31.1 section 8. R. F. Bukacek

Relative Permeability

Nielsen, R. F. SHORT CUTS TO FINDING RELATIVE PERMEABILITIES—2. *Oil Gas J.*, 47, 134 (1955) March 28.

Two examples are given illustrating the Welge method of obtaining relative permeabilities from core data. B. E. Eakin

Repressuring

McEachern, D. J. CANADIAN FIELD GETS GAS INJECTION SYSTEM. *Petroleum Eng.*, 27, E2-3 (1955) February.

Imperial Oil Ltd. has recently completed construction of a compressor station and transmission lines for the injection of 20 MMCF per day of natural gas into the Golden Spike D-3 reservoir. The field, station, and source of gas are discussed. B. E. Eakin

Rotary Percussion Drill

TEST OF NEW DRILL ENCOURAGING. *Oil Gas J.*, 47, 94-95 (1955) March 28.

The first tests of a semi-commercial model of the electrical rotary-percussion drill proved satisfactory. In the test a 14¾-inch hole was drilled in granite at rates as high as 35 feet per hour. Bit weights of 5000 to 10000 lbs. were used to about 20 rpm. A 9-inch tool is to be tested soon under oil field conditions. B. E. Eakin

Storage Reservoirs

Montgomery, P. H. HOW TO CONSTRUCT UNDERGROUND GAS STORAGE. *Petrol. Eng.*, 27, E4-6, 9 (1955) March.

This article presents some of the practical engineering problems to be met where a reservoir must be operated at high pressures. The paper covers for major construction features: 1) reclaiming abandoned wells, 2) replugging, 3) conditioning active wells, and 4) drilling new wells. B. E. Eakin

Super Inch

Reynolds, P. E. P. G. & E.'S SUPER INCH. *Gas Age*, 115, 40-43, 59, 60 (1955) March 24.

A report on some of the design features and operating experience on Pacific Gas and Electric 34" line from Topock, Arizona to Milpitas, California. R. F. Bukacek

Thermal Recovery

Jenkins, R. and Aronofsky, J. S. ANALYSIS OF HEAT TRANSFER PROCESSES IN POROUS MEDIA—NEW CONCEPTS IN RESERVOIR HEAT ENGINEERING. *Producers Monthly*, 19, 37-41 (1955) March.

The mechanism of heat transfer in a reservoir being produced by some thermal method of secondary recovery is discussed. Analysis of temperature-time curves for packed tubes subjected to a thermal production process in the laboratory indicate there are three important transfer processes involved: physical movement of the fluid, thermal condition, and transfer of

heat from fluid to solid. Further experimental work is needed to determine under what conditions each mechanism becomes most important. A list of problems that should be investigated posed by the thermal recovery techniques are given. B. E. Eakin

Underwater Pipe Lines

Collins, S. V. APPARATUS FOR LAYING AND RETRIEVING PIPE LINES. U. S. Reissue 23,963 (1955) March 15.

This invention relates to a method of extending a pipeline to an off-shore location and to extending such a pipeline across a body of water. It also relates to the method of entrenching such a line and to equipment which may be employed in accomplishing such extension and entrenchment. (Original U. S. 2,602,300)

R. F. Bukacek

Waterfloods

Buckwalter, J. F. INJECTION RATES TELL BOTTOM-HOLE STORY. *Petroleum Eng.*, 27, B96, 97, 99, 101-2 (1955) February.

This article is concerned with the interpretation of intake rate data from five-spot waterfloods. The knowledge gained through many years of study of water intake rates where both cores and reservoir data are available for a wide variety of flooding conditions is the basis for the conclusions reached. Twelve different types of intake rate curves are compared to a theoretical standard curve, and the variations discussed. B. E. Eakin

Egan, E. E. and McKay, A. S. NEW METHOD SIMPLIFIES WATER INJECTIVITY PROFILE LOGGING. *World Oil*, 140, 149-151, 158 (1955) March.

A slightly radioactive solution is used in a new technique to determine the water injection distribution for a well. The system requires providing the water in two measured streams from above the formation thru the annulus, and from below the formation thru the tubing. The annulus solution is slightly radioactive and the interface between the pure and tagged water is measured with a gamma-ray logging sonde. By varying the rates of the two streams and measuring the interface level, an injection profile of the well is obtained. B. E. Eakin

6. PETROLEUM AND SYNTHETIC LIQUID FUELS

Catalysts

Kratzer, M. B. (assigned to Stanolind Oil and Gas Co.) PREPARATION OF HIGHLY ACTIVE HYDROCARBON SYNTHESIS CATALYST. U. S. 2,704,293 (1955) March 15.

A two stage process for the synthesis of hydrocarbons is claimed where the first stage consists of a fluidized iron catalyst being operated at conditions of throughput, temperature, and pressure until the catalyst has disintegrated after the accumulation of varying amounts of carbon therein. The resulting low density catalyst is then transferred to a second-stage fluidized catalyst bed reactor where the tail gas from the first stage under normal operating conditions is converted to useful organic products.

H. A. Dirksen

Desulfurization

HYDROSULFURIZATION. *Oil Gas J.*, 53, 169-76 (1955) March 21.

Flow diagrams and descriptions are presented for five catalytic hydrogenation processes for the desulfurization of petroleum products. Cobalt-molybdenum-alumina and platinum catalysts are used in these process to convert the sulfur to hydrogen sulfide. The Shell Hydrodesulfurization process uses an outside source of hydrogen which combined with the liquid charge trickles down through a fixed catalyst bed. The Autofining process developed by British Petroleum Co., Ltd., like the Shell Process uses a cobalt-molybdenum-alumina catalyst, but the hydrogen for conversion of the sulfur is provided from the feed stock itself by controlled dehydrogenation of the naphthenes present. Three commercial units are being operated by B. P. Co. The Hydrofining process developed by Esso Research and Engineering Co. utilizes byproduct hydrogen from catalytic reforming. A variety of catalysts may be used. The process is used in seven commercial units. The Unifining process in addition to sulfur removes nitrogen, oxygen and metal contaminants. Hydrogen must be supplied by an outside source. The first commercial installation was in 1953 while nearly 30 units are presently in the process of design and construction. A combination catalytic reforming and desulfurization process has been designed by M. W. Kellogg Co. employing a

platinum catalyst. Byproduct hydrogen from the reforming combines catalytically with sulfur. In addition to desulfurization, all of the above processes upgrade the treated stocks.

E. J. Pyrcioch

Shale Gasolines

Miller, C. B., Jr. HOW STABLE IS SHALE-OIL GASOLINE? *Petrol. Refiner.*, 34, 124-6 (1955) February.

Accelerated oxidation tests on uninhibited cracked shale-oil gasoline show it to be extremely unstable, due probably to the presence of reactive olefins. However, these gasolines, just like cracked gasolines from petroleum, are susceptible to stabilization by addition of aminophenol and phenylenediamine type antioxidants in amounts of 2 to 20 pounds per 1000 barrels.

E. B. Shultz

Shale Retorting

Royster, P. H. PROCESS FOR THE DESTRUCTIVE DISTILLATION OF CARBONACEOUS MATERIALS. U. S. 2,705,697 (1955) April 5.

Higher recovery of distillate in the form of oil is obtained from oil shale (or other carbonaceous matter;—coal, garbage, still bottoms) by rapidly heating a fixed bed of shale particles with a high-velocity stream of carrier gas. The carrier gas, after oil recovery, is reheated by passage through one of a pair of refractory-filled reversing regenerators, and returned to the retort at a velocity sufficient to form a thermal wave-front which traverses the bed downward. After the wave-front has passed to the base of the bed, the shale residue is cooled by air blown in at the bottom, which also burns out any residual carbon and transfers sensible heat from the shale to the stove refractories, where it is burned with some of the vented carrier gas.

O. P. Brysch

Sonic Lift

Stumm, J. B. THE SONIC OILWELL PUMP. *Petroleum Eng.*, 27, B107-10 (1955) March.

The entrance of sonic devices into the petroleum industry has resulted in many new and improved tools. The latest, the sonic pump, has many features that will appeal to the field engineer: low initial cost, no sucker rods or pump barrel, inherent high pumping rate, low power requirements, and ability to pump sandy or nonlubricating fluids efficiently even in crooked or directionally drilled wells. The device shows signs of becoming another accepted method of lifting oil.

B. E. Eakin

Sulfur Recovery

Hixon, F. E. SULFUR AND SULPHURIC ACID FROM PETROLEUM. *Chem. and Ind.* (British) No. 13, 332-40 (1955) March 26.

Present trends in fuel and chemical economics are making the petroleum refinery an exporter of sulfur and sulfuric acid. Increased processing of higher sulfur crudes (Middle East sulfur runs 1.5% to 2.5%) has called attention to the use of catalytic reforming and polyforming processes, especially the Hydrodesulfurizing, Unifining and Autofining processes, which convert petroleum sulfur compounds into recoverable hydrogen sulfide. The H2S recovered, by Girbitol, phosphate, alkazid, phenolate or vacuum carbonate scrubbing, is usually converted to sulfur by the Claus process by catalytic oxidation of a 1:2 mixture of SO2 and H2S, as shown in the flowsheet of the Stanlow refinery (40 to 50 tons/day of 99.9% purity). Sulfuric acid treatment of crude and distilled products gives considerable quantities of waste acid "sludge", of 25% to 90% H2SO4 content. This sludge may be disposed of by (a) burning as fuel, b) hydrolyzing to recover dilute acid, c) decomposing to coke and SO2, the latter for reconversion to contact acid. The Stanlow sludge disposal plant is discussed briefly. O. P. Brysch

7. ANALYTICAL METHODS AND TESTS

Carbon Monoxide in Air

Shepherd, M., Schuhmann, S., and Kilday, M. V. DETERMINATION OF CARBON MONOXIDE IN AIR POLLUTION STUDIES. *Anal. Chem.*, 27, 380-83 (1955) March.

The NBS colorimetric indicating gel, previously developed for the detection of carbon monoxide in air, can be used to determine very low concentrations if several refinements of the method are employed. A method is described for determining amounts of 1 to 0.1 p.p.m. and 10 to 25 p.p.m. The method may be applied in studies of air pollution. Authors' Abstract

H_2S Recorder

Offutt, E. B. and Sorg, L. V. ANALYZER-RECORDER FOR MEASURING HYDROGEN SULFIDE IN AIR. *Anal. Chem.*, 27, 429-32 (1955) March.

An instrument for measuring and recording hydrogen sulfide in air in the concentration range of 0 to 100 p.p.m. has been developed for testing refinery atmospheres. The instrument is based upon the use of special film prepared by coating blank 16-mm. motion picture film with buffered lead acetate. The sample is pumped continuously through an exposure hood, where the hydrogen sulfide reacts with the film coating to form a stain. A light beam through the stained film falls on a photoelectric cell and generates an electric current proportional to the hydrogen sulfide concentration. This current operates a conventional electronic recording potentiometer. A warning alarm sound automatically if the hydrogen sulfide exceeds 25 p.p.m.

Authors' Abstract

Infrared Analysis

Wilks, P. A., Jr. CONSIDER INFRARED FOR GAS ANALYSIS. *Petrol. Refiner*, 34, 155-8 (1955) February.

The use of infrared analyzers for the continuous analysis of gas streams as well as the analysis of individual samples is discussed. Specific applications and range of costs of this type of equipment is also presented. D. V. Kniebes

Petroleum Correlations

Chu, J. C. and Staffel, E. J. CORRELATION BETWEEN EQUILIBRIUM FLASH VAPORIZATION AND ASTM DISTILLATION DATA OF PETROLEUM MIXTURES. *J. Inst. Petroleum* (British), 41, 92-99 (1955) March.

Sixty-five sets of data contributed by various oil companies were used in developing the correlation. Starting with the atmospheric ASTM curve, several variables were investigated, including characterization factor, slope ratio, average molecular weight, and various slopes of ASTM distillation curves. The correlation finally developed consists of an improved method in predicting the 50-percent equilibrium flash vaporization (EFV) from 50 per cent ASTM point with characterization factor, and 10-70 per cent ASTM slope as additional variables. The slope of EFV at different percentages of vaporization are related to those of ASTM in the same way as suggested by Edmister and Pollack. However, the graph has been modified in the light of sixty-five sets of consistent data. The present correlation, as well as the previous ones, was checked with additional experimental data. For the 50 per cent correlation the arithmetic average error is —12.5° F. and mean deviation ±13.5° F. This represents an improvement over the existing methods ranging from 40 to 110 per cent. The improvement of similar order of magnitude is obtained at the other points. Authors' Abstract

Spectrochemical Standards

Jaycox, E. K. A SPECTROCHEMICAL PROCEDURE OF GENERAL APPLICABILITY. *Anal. Chem.*, 27, 347-50 (1955) March.

A procedure is described for a universal method of spectrochemical analysis based on a single set of standards, by which any material, in solid or liquid form, can be analyzed semiquantitatively for all metallic components present. Moderate speed is possible after the standard curves have once been established. Accuracy of less than ± 10% is possible for most metallic elements, but a few individual values fall outside of a ± 25% accuracy goal. R. R. Amrine

Water Determination

Peters, E. D. and Jungnickel, J. L. IMPROVEMENTS IN KARL FISCHER METHOD FOR DETERMINATION OF WATER. *Anal. Chem.*, 27, 450-53 (1955) March.

Improvements in the Karl Fischer method by the substitution of methyl cellosolve for methanol, and the use of a mixture of ethylene glycol and pyridine are cited. R. F. Bukacek

8. GENERAL AND PHYSICAL CHEMISTRY

Benzene Equilibrium

Hoffman, D. S. and Weber, J. H. VAPOR CONSTANTS FOR BENZENE EQUILIBRIUM. *Petrol, Refiner*, 34, 137-9 (1955) February.

Fugacity of the liquid, fugacity of the vapor, and vaporization equilibrium constants were

calculated for benzene over the range 100 to 550° F. from the recently published thermodynamic data of Organick and Studhalter.

D. M. Mason

Compressibility

Nicholson, G. A. and Schneider, W. G. COMPRESSIBILITY OF GASES AT HIGH TEMPERATURES. IX. SECOND VIRIAL COEFFICIENTS AND THE INTERMOLECULAR POTENTIAL OF NEON. *Can. J. Chem.*, 33, 589-956 (1955) April.

The second virial coefficients of neon have been determined in the temperature range 0° to 700° C. and the pressure range 10 to 80 atmospheres. These data were combined with published low temperature (—150° to 0° C.) second virial data, to investigate the intermolecular potentials of neon using both a Lennard-Jones potential, with a 9th and 12th power repulsion term, and also a modified Buckingham exponential-six potential. The agreement between observed and calculated values of B (T) was excellent for both the exponential-six and the Lennard-Jones 12:6 potentials and slightly less satisfactory for the Lennard-Jones 9:6 potential.

Authors' Abstract

Whalley, E., Lupien, Y., and Schneider, W. G. THE COMPRESSIBILITY OF GASES AT HIGH TEMPERATURES. X. XENON IN THE TEMPERATURE RANGE 0° TO 700° C. AND THE PRESSURE RANGE 8 TO 50 ATMOSPHERES. *Can. J. Chem.*, 33, 633-636 (1955) April.

The virial cofficients of xenon have been measured in the temperature and pressure range described. The results are compared with previous measurements. Authors' Abstract

Dynamic Pressure

Brombacher, W. G. and Lashof, T. W. BIBLIOGRAPHY AND INDEX ON DYNAMIC PRESSURE MEASUREMENT. Nat. Bur. Stand. Circ. 558 (1955) February 14.

This circular contains a bibliography of 850 items on dynamic pressure measurement and, in less detail, on related subjects such as static pressure measurements and general information on the components of instruments. An index of the bibliography by both subject and author is included. Authors' Abstract

Zeolite Screens

Brien, E. B. MOLECULAR "SIEVES" OFFER NEW SEPARATION PROCESS. *Petrol. Eng.*, 27, C35-36 (1955) March.

The use of crystalline zeolites as adsorbants or screens permit the separation of mixtures of gases according to molecular size, allowing small molecules to pass through, and retaining or preventing the passage of larger molecules. The new materials can remove water from air at 212° F., when alumina or silica gel cannot. The material can be reactivated by heating and purging. B. E. Eakin

9. ORGANIC CHEMISTRY

Ammonia

Davenport, C. H. BOOM STILL ON FOR U. S. AMMONIA. *Petrol. Refiner*, 34, 141-48 (1955) April.

The growing demand for fixed nitrogen is not limited to the fertilizer field. Many military and petrochemical uses are accounting for approximately 25% of the total production. These demands will increase and future consumption should continue to rise. W. G. Bair

AMMONIA — A RAPIDLY GROWING PETROCHEMICAL. *World Petroleum*, 26, 42-45 (1955) April.

This article reviews briefly the growth of ammonia manufacture in the United States, the present and anticipated production plant capacity, raw materials and processes used in ammonia manufacture and the agricultural and industrial applications. The use of natural gas as a raw material for ammonia production has risen to 80 percent of the total in 1954. Low cost by-product hydrogen from petroleum refinery operations has led several refineries to construct ammonia production plants. The Office of Defense Mobilization to encourage production has granted certificates for rapid write-offs of capital investments in order to bring domestic capacity to 3.5 million tons by January 1, 1957. This figure will apparently be surpassed as actual and planned capacity now amounts to 3.75 million tons. About 70 percent of the ammonia is used for agricultural purposes, the remainder principally for industrial purposes. E. J. Pyrcioch

10. CHEMICAL ENGINEERING

Column Design

Broaddus, J. E., Morse, A. J., and Huntington, R. L. HOW TO DRAIN BUBBLE-CAP COLUMNS. *Petroleum Eng.*, 27, C38-40 (1955) February.

A report of studies on drainage times in bubble-cap columns and a correlation of data.
R. F. Bukacek

Salmon, R. MULTICOMPONENT FRACTIONATION. *Petroleum Eng.*, 27, C42-46 (1955) February.

An adaptation of the absorption factor approach to the Thiele-Geddes calculation is presented which is believed to give conservative results where product compositions are of required—given feed, number of plates and the reflux ratio. R. F. Bukacek

Extraction

Lyles, H. R. CITIES SERVICE IMPROVES OPERATION, REDUCES COSTS. *Oil Gas J.*, 53, 126-28 (1955) March 7.

Stripping towers with perforated plates have replaced the earlier Raschig-ring packed tower at Cities Service Unisol unit at the Lake Charles refinery. The Unisol process removes mercaptans from gasolines by counter-current extraction with a caustic-methyl alcohol mixture. The new stripper is constructed of $\frac{7}{16}$" monel walls for resistance against corrosion, and to prevent caustic carry-over in the overhead vapors, a steam foam-breaking coil above the feed tray and a wire-mesh coalescing de-mister were installed. Improved extraction-efficiency and lower chemical costs have resulted.
E. J. Pyrcioch

Fractionation

Rose, A. and Biles, W. R. RELATIVE VOLATILITY OF BINARY MIXTURES FROM A FRACTIONATING COLUMN AT FINITE REFLUX. *Chem. Eng. Progress*, 51, 138-140 (1955) March.

Points on the vapor-liquid equilibrium concentration curve are found by taking advantage of the fact that under pinch conditions the equilibrium concentrations of the more volatile component in the still pot are the same as at the intersection of the equilibrium curve and operating line. Values of relative volatility can be calculated from the equilibrium concentration values obtained. R. T. Ellington

Heat Exchangers

Clarke, L. and Winston, R. E. CALCULATION OF FINSIDE COEFFICIENTS IN LONGITUDINAL FINNED-TUBE EXCHANGERS. *Chem. Eng. Progress*, 51, 147-150 (1955) March.

The J factor is related to annuli encountered in double-pipe finned-tube heat exchangers. A conclusion is presented for estimation of the J factor in the streamline flow range. W. G. Bair

Spray Drying

Buckham, J. A. and Moulton, R. W. SPRAY DRYING. *Chem. Eng. Progress*, 51, 126-133 (1955) March.

A vertical concurrent-flow spray dryer was used to investigate the amount of recirculation within the drying chamber and to determine particle expansion effects. It was found the recirculation effects amounted to about three fourths that for complete mixing. Large spray particles were observed to expand more during drying than small particles and the order of magnitude of particle expansion is such as to keep the surface area to mass ratio nearly uniform for all particles. R. T. Ellington

11. PROCESS EQUIPMENT AND INSTRUMENTATION

Computer Use

ELECTRONIC COMPUTERS AND THE GAS INDUSTRY. *Gas World* (British), 141, 705-6 (1955) March 12.

A brief review of the history of electronic computers is presented and then a descriptive survey of currently available computers is given. The utility of these computers solving everyday business problems is indicated. G. G. Wilson

Equipment Records

Dixon, G. F. CONTROLLING GENERAL

EQUIPMENT. *Amer. Gas Assoc. Monthly*, 37, 15-17, 42-3 (1955) March.
A method of numbering, recording, and controlling general equipment which involves the use of IBM cards is described. Method has been in use for 3 years by Milwaukee Gas Light Co.
G. G. Wilson

Inspection of Vessels

Long, C. W. TURNAROUND PRESSURE VESSEL INSPECTION. *Petrol. Refiner*, 34, 151-53 (1955) March.
Methods and procedures are presented for the periodic inspection of unfired pressure vessels. The examination of the vessel walls and joints, the determination of shell thickness, a hydrostatic test, and the maintenance of complete records on each vessel are prescribed.
E. J. Pyrcioch

Process Analyzers

Thornton, D. P., Jr. ARE PROCESS ANALYZERS FOR YOU? *Petroleum Processing*, 10, 204-10 (1955) February.
A high sensitivity infra-red analyzer and a differential refractometer, both rugged enough for industrial use have been developed by Phillips Petroleum Co. for process analysis. Use of these instruments has provided accurate and immediate control of various process variables to maintain product quality. The differential refractometer is found to be particularly applicable in cases where multicomponent mixtures are too complex to allow accurate measurement by infra-red methods, but where the refractive indexes fall into two groups, so that for refractive index measurements the entire system can be treated as a binary mixture.
E. F. Searight

Turbine Controls

Steen-Johnson, H. CONTROLLING SPEED IN PROCESS CONTROLS — DESIGNING AND APPLYING HIGH-SPEED TURBINES—7. *Oil Gas J.*, 53, 137-38 (1955) March 28.
A description of Gulf Refining Company's radio-controlled automatic producing facilities.
R. F. Bukacek

CONTROLLING PRODUCTION BY RADIO. *Oil Gas J.*, 53, 112-14 (1955) March 28.
A description of a speed control method for the process. Applications of high speed turbines.
R. F. Bukacek

Tank Protection

Lynn, C. V. PROTECT YOUR TANK INVESTMENTS. *Petrol. Processing*, 10, 361-62 (1955) March.
Five factors important in controlling the annual expenses of refinery tankage are discussed along with other factors important to cost.
R. F. Bukacek

12. MATERIALS OF CONSTRUCTION

Cathodic Protection

Allen, H. CORROSION PROTECTION A CONTINUOUS JOB. *Pipe Line Ind.*, 2, 66, 69, 70, 72 (1955) March.
Summary of maintenance requirements and procedures for cathodic protection installations.
G. G. Wilson

Griffith, D. O. CATHODIC PROTECTION APPLIED TO A LARGE-DIAMETER OIL PIPE LINE SYSTEM. *Corrosion*, 11, 53-56 (1955) March.
The installation and maintenance of a cathodic protection system on 455 miles of coated 24" pipe is described. A unique feature of the installation was the use of unidirectional bonds involving the application of germanium rectifier cells.
G. G. Wilson

Ringer, F. W. SOLUTION OF CATHODIC PROTECTION INTERFERENCE PROBLEMS. *Corrosion*, 11, 45-52 (1955) March.
A method of obtaining data on the extent of interference to be expected from a cathodic protection installation prior to its installation is described. Method is based on the electrical network concept developed by Dr. J. M. Pearson and is particularly useful in stray-current areas. The resistance of any bonds required to mitigate interference problems can also be obtained by use of this method.
G. G. Wilson

Stroud, C. D. GRAPHICAL METHOD OF CHECKING STABILITY OF CATHODIC-PROTECTION RECTIFIER STACKS. *Oil Gas J.*, 53, 126, 8, 9 (1955) March 28.
A test procedure for evaluating the efficiency of cathodic protection of rectifier stacks is presented.
G. G. Wilson

Wainwright, R. M. FOR CATHODIC PROTECTION POWER—RECTIFIER OR SACRIFICIAL ANODES? *Gas*, 31, 77-84 (1955) March.

The factors affecting cathodic protection costs and choice of cathodic protection system are discussed, a method of combining cost factors to arrive at overall cost curves is presented, and the analytical methods presented are illustrated by application to particular cases. G. G. Wilson

Whitley, B. J., Jr. THE FACTOR OF SOIL RESISTIVITY IN ESTABLISHING CORROSION CONTROL. *Gas*, 31, 137, 140 (1955) March.

The factors affecting soil restivity are outlined and the affect of resistivity on corrosion rates, ground-bed design, power cost, and cathodic protection current distribution are briefly treated. G. G. Wilson

Coatings

Rasor, J. SELECTING A HOLIDAY DETECTOR. *Gas*, 31, 127-36 (1955) March.

The electrical load circuit of a typical holiday detector is analyzed. Types of energy sources and high voltage generating systems and their operation are outlined, and the subject of proper test voltage is discussed. Some basic rules for the field use of commercial detectors are presented and recent industrial applications of detectors are mentioned. G. G. Wilson

Shepard, A. P. and McWaters, R. J. METALLIZING FOR CORROSION PREVENTION. *Corrosion*, 11, 29-32 (1955) March.

Presentation of the problems and techniques of spraying molten zinc and aluminum on iron and steel. Specific applications discussed include exhaust stacks and mufflers of gas compressors. G. G. Wilson

Corrosion

Brannon, R. A. HOW TO COMBAT INTERNAL CORROSION. *Pipe Line Ind.*, 2, 44-9 (1955) March.

Review of internal corrosion problems and their solution in the gas and oil industry. G. G. Wilson

Judah, M. A. NACE MEETING MARKS ITS FIRST TEN YEARS. *Pipe Line Ind.*, 2, 74, 76, 79, 80 (1955) March.

Brief history of National Association of Corrosion Engineers. Includes objectives of association and outline of primary activities of association. G. G. Wilson

Riordan, M. A. HERE IS WHY PIPE LINES CORRODE. *Pipe Line Ind.*, 2, 36-9 (1955) March.

Brief, illustrated persentation of causes of galvanic corrosion. G. G. Wilson

Wade, O. W. START CORROSION PROTECTION *BEFORE* THE PIPE LINE IS LAID. *Pipe Line Ind.*, 2, 50-3 (1955) March.

The advantages of pre-construction planning by a corrosion engineer of coating, insulation, and test lead requirements of a pipeline are outlines. G. G. Wilson

Plastic Pipe

Corfield, G. PLASTIC PIPE SUBCOMMITTEE PROGRESSING TOWARD ESTABLISHMENT OF STANDARDS. *Gas*, 31, 75-6 (1955) March.

A "progress report" on the sub-committee. Includes a summary of the results of a questionnaire on the use of plastic pipe sent to 55 gas companies in October, 1953, and the recommendations adopted by the committee at their meeting March 9, 1954. G. G. Wilson

Elliott, P. M. AN INTRODUCTION TO "KRALASTIC". *Gas*, 31, 72-3 (1955) March.

A brief description of the properties of kralastic (acrylonitrile-butadiene rubbers combined with acrylonitrile-styrene resins) when fabricated into pipe including its bursting pressure and long-term effective tensile strength. G. G. Wilson

Meyer, L. W. and Scogin, R. J. LONG-TERM CREEP OF PIPE EXTRUDED FROM TENITE BUTYRATE PLASTIC. *Gas*, 31, 62-70 (1955) March.

A summary of creep data obtained to date by Tennessee Eastman Co. at temperatures from 80-120° F. and pressures from 50-200 psi. Results are expressed as percent increase in O.D. of pipe. A table of safe hoop stress values for each group of pipe tested is presented. G. G. Wilson

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Canadian Journal of Technology
Chemical Abstracts
Chemical and Engineering News
Chemical and Process Engineering
Chemical Bulletin
Chemical Engineering
Chemical Engineering Costs Quarterly
Chemical Engineering Progress
Chemical Engineering Science
Chemical Processing
Chemical Reviews
Chemical Society (London) Journal
Chemical Week
Chemist
Chemistry
Chemistry and Industry
Coal Heat
Coke and Gas
Combustion
Compressed Air
Computers and Automation
Construction Methods and Equipment
Corrosion
Current Chemical Papers (Chem. Soc., London)

Drilling

Electronics
Endeavour
Engineers' Digest
Erdöl und Kohle

Faraday Society. Transactions
Fuel
Fuel Abstracts
Fuel Efficiency
Fueloil and Oil Heat

Gas
Gas Age
Gas and Oil Power
Gas Heat
Gas Journal
Gas News (Chicago)
Gas Council Publications
Gas Times
Gas und Wasserfach
Gas World
Heating, Piping and Air Conditioning

Independent Petroleum Association of America Monthly
Industrial and Engineering Chemistry
Industrial Finishing
Industrial Gas (American)
Industrial Gas (British)
Industrial Heating
Institute of Fuel (British). Journal
Institute of Petroleum (British). Journal
Institute of Gas Technology Publications
Institution of Gas Engineers. Bulletins, Communications and Transactions
Instruments

Jet Propulsion
Journal des Usines a Gaz
Journal of Applied Chemistry
Journal of Applied Mechanics
Journal of Applied Physics
Journal of Chemical Education
Journal of Chemical Physics
Journal of Engineering Education
Journal of Metals
Journal of Organic Chemistry
Journal of Petroleum Technology
Journal of Physical Chemistry
Journal of Research (National Bureau of Standards)
Journal of Scientific Instruments

Laboratory Practice
LP-Gas
Lubrication

Materials and Methods
Mathematical Aids
Mechanical Engineering
Mining Engineering

National Advisory Committee for Aeronautics, Reports
National Fire Protection Association Quarterly
National Gas Bulletin of Australia
National Petroleum News

Official Gazette of the U.S. Patent Office
Oil and Gas Journal
Oil, Paint and Drug Reporter
Optical Society of America. Journal

Petroleum
Petroleum Engineer
Petroleum Processing
Petroleum Refiner
Physics Today
Pipe Line Industry
Power
Producers Monthly

Public Utilities Fortnightly

Refrigerating Engineering
Research Reports
Review of Scientific Instruments
Revue Generale du Gaz
Rivista dei Combustibili

Science
Southern Gas Association Progress
Spectrochemica Acta
Svenska Gasverksaföreningens Månadsblad

Technical News Bulletin

U.S. Bureau of Mines. Bulletins, Information Circulars, Reports of Investigations and Technical Papers

World Oil
World Petroleum

THE GAS INDUSTRY'S OWN EDUCATIONAL AND RESEARCH FACILITY